Maintenance of Physical Activity Among Faculty and Staff in University Settings

Kerry Whipple, Judy Kinney, and Mark Kattenbraker

Abstract

Previous studies have placed little emphasis on maintenance of healthy behaviors longer than six months. This study examined factors that contribute to maintenance of physical activity among faculty and staff in university settings. A 55-item survey on physical activity maintenance was used to assess attitudes towards exercise, exercise self-efficacy, exercise planning, and barriers to exercise. A Principal Components Factor Analysis with Varimax Rotation revealed four factors. A One way ANOVA was used to determine differences between maintainers and non-maintainers with regard to planning, attitudes, barriers, excuse making, and exercise self-efficacy. Results indicated that maintainers were more likely than non-maintainers to have a plan for exercise. Maintainers also had higher levels of self-efficacy and lower scores in excuse making. Findings indicate areas specific to maintenance of physical activity that health educators can emphasize in program planning. Findings indicated that higher levels of self-efficacy made a difference in action. Incorporating self-efficacy strategies into health education programs may be the key for success of long term maintenance of physical activity.

Introduction

Many negative ailments have been reported for those with a sedentary lifestyle (De Bourdeaudhuij & Van Oost, 1999). Studies have investigated potential benefits of moderate and light exercise related to stress reduction, improved self-esteem, and maintenance of optimal body weight (De Bourdeaudhuij & Van Oost). Because of the relationship between physical inactivity and various chronic diseases, several objectives of *Healthy People 2010* were developed related to increasing physical activity (U.S. Department of Health and Human Services [USDHHS], 2007). Numerous barriers to maintaining physical activity have been cited including time, seasonal and geographic influences, physical safety, and access to facilities (Kohl & Hobbs, 1998). Barriers have traditionally been identified by asking participants what barriers they are experiencing and addressing removal of those barriers (Tai-Seale, 2003). However, asking individuals who have been successful at overcoming barriers how they achieved this success is also beneficial to designing interventions.

A consistent theme in current literature is that physical activity is effective in alleviating serious medical problems only if it is performed on a regular basis (Litt, Kleppinger, & Judge, 2002). To achieve such physical activity benefits, health professionals must not only engage individuals in healthy behaviors, but also focus on maintenance of those behaviors. Few studies have focused on enhancing long-term maintenance of an active lifestyle that is critical for achieving most of its health benefits (King et al., 2002).

The Transtheoretical Model of Behavior Change has been used to integrate processes and principles of change from across major theories of intervention (Prochaska, Redding, & Evers, 2002). The basis of the model is that individuals engaging in a new behavior move through a series of stages (Marcus, Rakowski, & Rossi, 1992; Marcus, Rossi, Selby, Niaura, & Abrams, 1992). Previous studies applying stages of change to physical activity reported 35-47% of participants to be in the maintenance stage (Marcus, Rossi, et al., 1992; Zizzi, Keeler, & Watson, 2006). Stage theories have sought to explain preparation and adoption of behavior change with less emphasis on maintenance of those behaviors for longer than a six month period (Marcus, Rossi, et al., 1992; Prochaska et al., 2002). Defining maintenance as six months, however, poses a problem when considering that 50% of individuals who join an exercise program will drop out during the first three to six months (Marcus, Rossi, et al., 1992). In addition, between 50% and 70% drop out within 12 to 24 months (Zizzi et al., 2006). Therefore, those who self report as having engaged in physical activity for six months are typically defined as maintainers when after 12 months they may no longer be physically active.

Many studies examining maintenance of physical activity have focused on such populations as cardiac rehabilitation patients, elderly, rural, adolescents, and those of low socio economic status (Chen & Miller, 2003; Luszczynaka & Schwarzer, 2003). Few studies have focused on university faculty and staff and differentiation between maintainers and non-maintainers. While the university population may be more knowledgeable about the benefits of physical activity, knowledge does not always equate to action. Time commitments, motivation, fatigue, and increased

* Kerry Whipple, PhD, CHES; Department of Health and Applied Human Sciences, University of North Carolina, 601 S. College Road, Wilmington, NC 28403-5956; Telephone: 910-962-7453; Fax: 910-962-7073; E-mail: whipplek@uncw.edu; Chapter: At-Large

Judy Kinney, PhD; Department of Health and Applied Human Sciences, University of North Carolina, Wilmington, NC 28403-5956

Mark Kattenbraker, PhD; Physical Education Department, Eastern Illinois University, Charleston, IL 61920

* Corresponding Author

use of technology are a few of the reportable barriers applicable to this population (Guggenbuhl, 2004).

The purpose of this study was to examine factors that contribute to maintenance of physical activity among faculty and staff in university settings. Two hypotheses guided this study: (a) Individuals who meet the criteria of a "maintainer" would have higher levels of self-efficacy than non-maintainers, and (b) individuals who meet the criteria of a "maintainer" would be more likely to have an established plan for physical activity than non-maintainers. For the purposes of this study, maintenance was defined using two criteria. The first criterion was having spent 90 minutes or more in moderate to vigorous physical activity per week. Because few studies have explored maintenance for longer than a six month period, the second criterion was adhering to this weekly level of exercise for at least 48 weeks in the last year. Forty-eight weeks was determined to be the equivalent of one year when taking into account inactivity during vacations and holidays. Participants were first asked to recall the number of minutes they engaged in either moderate or vigorous activity in the past seven days. Then participants were asked to recall on average how many weeks in the last year they had maintained this level of exercise.

Methods

Sample

The sample for this study included faculty and staff at three universities of approximately equal size and demographics. University A, located in the southeast, had a fall 2006 student enrollment of 11,848 and approximately 2,000 full time faculty and staff according to its published directory. University B, located in the Midwest, had a fall 2006 student enrollment of 12,349 and approximately 1,200 full time faculty and staff. University C, located in the northeast, had a fall 2006 student enrollment of 7,300 and approximately 1,500 full time faculty and staff. Departments of 10 or more faculty and staff were included in the sample representing approximately 119 departments (33% of total departments

Table 1

Demographic Findings

Gender		Flexible schedule	
Male	46%	Yes	28%
Female	54%	No	72%
Ethnicity		Age	
Caucasian	91%	21-30	9%
African American	4%	31-40	15%
Hispanic	1%	41-50	28%
Multi racial	1%	51-60	36%
Asian	2%	61-70	10%
Other	1%	71+	1%
Education		Job title	
High school	8%	Staff	31%
BS/BA	15%	Adjunct/Instructor/Lecturer	20%
MS/MA	27%	Assistant/Associate/Full Professor	42%
PhD/EdD	45%	Administrator	7%
Other	5%		
Marital status		Number of children at home	
Single	14%	None	63%
Married	70%	One	18%
Significant other	5%	Two	13%
Divorced	8%	Three	6%
Widowed	2%		
Other	1%	Access to campus recreation facilities	
		None available	2%
Place of employment		Not able to use facilities	7%
University A	53%	Pay full rate	18%
University B	28%	Pay reduced rate	23%
University C	19%	Use free of charge	51%

among the three schools) and 65% (n = 3,071) of the total number of employees in the three universities. Participants were asked to identify which department they represented giving researchers response rates among each department. Of the 3,071 distributed surveys, 653 participants responded (21%). Table 1 illustrates additional demographic findings. Table 2 illustrates response rates.

Instrumentation

Based on the review of literature, this project used questions and/or scales from previous studies that specifically measured issues related to maintenance of physical activity (Benisovich, Rossi, Norman, & Nigg, 1998; Luszczynaka & Schwarzer, 2003). A pilot test was conducted using two health education departments. Responses were analyzed, and unclear items were either eliminated or revised. The final version of the survey consisted of 55 questions. This version of the survey was then reviewed by three experts in the field of health and physical education to establish content validity.

To differentiate maintainers from non-maintainers, respondents were asked the number of minutes they engaged in moderate physical activity (defined as "your heart beats faster than normal and you can talk but not sing [e.g., fast walking, aerobics class, strength training, swimming]") and vigorous physical activity (defined as "your heart rate increases a lot; you can't talk or your talking is broken up by large breaths [e.g., stair machine, jogging or running, tennis, racquetball]"). Participants were also asked how many weeks during the past year they maintained this activity as well as the number of minutes per week they maintained this level.

Attitudes toward physical activity included six statements about exercise (interesting, boring, healthy) that respondents rated on a four-point Likert scale from strongly disagree to strongly agree. Barriers to maintaining regular exercise consisted of six statements that identified specific reasons why physical activity was not maintained (e.g., I am prevented from maintaining my exercise program because of.....time, cost, accessibility, lack of knowledge). Respondents used the same four-point Likert scale for each statement. The planning scale was adapted from Luszczynska and Schwarzer's (2003) work on the connection between self-efficacy and planning and included five statements such as "I have a detailed plan for when to exercise;" and "I have a detailed plan for where to exercise." Respondents used a three-point Likert scale (never, sometimes, and always).

The Exercise Self-Efficacy scale (Benisovich et al., 1998) was an 18-item scale that measured the participants' confidence in ability to exercise despite barriers. The scale used a five-point Likert scale from one (not at all confident) to five (completely confident) and included such items as "I am confident to exercise when I am under a lot of stress," "...when I am depressed," and "...when it's raining or snowing outside." The scale was factor analyzed and revealed six subscales – each subscale included three items: negative affect, excuse making, must exercise alone, inconvenient to exercise, resistance from others, and bad weather. The Self-Efficacy scale was part of a battery of psychological measures that were developed by Benisovich et al.

Data Collection

All three participating universities received approval from their respective Human Subjects Review Boards. In spring of 2006, surveys were mailed to all identified departments in the three universities. Surveys were sent to department chairpersons with a cover letter that explained the purpose of the study and asked that they distribute the surveys to faculty and staff in their respective departments. Faculty and staff received a cover letter explaining the purpose of the study, the survey, and a self addressed stamped envelope in which to return completed surveys. Completed surveys were mailed to the primary investigator for data entry and analysis. Participants were asked to return the surveys within 60 days.

Data Analysis

For the purpose of this study, all data were coded and analyzed using the Statistical Package for Social Science (SPSS) – Windows version 14.0. Null hypotheses were rejected at or below the .05 level of significance. Analysis conducted in this study included frequency distributions, means, standard deviations, Chi Square analysis, Analysis

Table 2

Response Rate by University

University	Total Number of Faculty/Staff on Campus	Number Surveyed (Percent)	Number Responded (Percent)	Proportion of Total Sample
A	1,958	1,312 (67%)	346 (26%)	53%
B	1,488	982 (66%)	186 (19%)	28%
C	1,177	777 (66%)	121 (16%)	19%
Total	4,623	3,071 (66%)	653 (21%)	100%

of Variance (ANOVA), Principal Components Factor Analysis, and reliability analysis.

Results

Those individuals who reported they exercised a minimum of 90 minutes a week for a minimum of 48 weeks were defined as "maintainers." There were a total of 324 respondents who met this criterion. Those individuals who did not exercise at all, did not exercise a minimum of 90 minutes a week, and/or had exercised less than 48 weeks were defined as "non-maintainers." There were a total of 330 respondents who met this criterion.

A Principal Components Analysis with Varimax rotation was performed on the Likert scale items that included questions pertaining to planning, barriers to exercise, and attitudes toward exercise. Since the Exercise Self-Efficacy scale (Benisovich et al., 1998) had established psychometric properties and factor analysis completed, these items were not used in the analysis. A total of 17 questions revealed four factors. Only factors with Eigenvalues over 1.0 were included. These four factors accounted for 63% of the total variance.

Reliability analysis was conducted on each factor which resulted in the elimination of several questions to improve alpha levels. The first factor called Planning had a total of five items and an original alpha level of .88. Removing the item "I have a detailed plan with whom to exercise" increased the alpha level to .92. The second factor identified as Facility Barriers included three items and had an alpha level of .82. All three items remained in this factor. The third factor had a total of 6 items and an alpha level of .41. Removing three items increased the alpha level to .77. The three items included "I find physical activity unpleasant," "I find physical activity boring," and "I am prevented from maintaining my exercise program because of lack of interest in being physically active." The last factor labeled Positive Attitudes Towards Exercise was reduced from three items to two items which improved the alpha level from -.03 to .76. The items included viewing physical activity as healthy and good.

A Principal Components Analysis with Varimax rotation was performed on the Likert scale items that included questions pertaining to planning, barriers to exercise and attitudes toward exercise.

The re-factored items (12 instead of 17) accounted for 76% of the variance. Factor one, Planning, accounted for 36.2% (á = .92); factor two, Facility Barriers, accounted for an additional 16.2% (á = .82); factor three, Negative Attitudes, accounted for 13.3% (á = .77); and factor four accounted for 10.5% of the variance (á = .76). The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy is an analysis that "predicts if data are likely to factor well, based on correlation and partial correlation" (Garson, 2007, p. 15). It is recommended this level be at least .60, for this analysis the KMO was well above the recommended level at .798. Table 3 contains the high factor loadings and the factor names.

To determine if any differences existed in responses by university, a Chi Square analysis was run between maintainers and non-maintainers and revealed no significant difference ($\div^2(2) = 0.12$, $p > .05$). Since there were no significant differences between groups in terms of where the individuals worked, all other analyses in this study combined the data from all schools.

Differences between Maintainers and Non-Maintainers

The first factor had four questions on whether participants made detailed plans for when to exercise, where, how to exercise, and how often they would exercise.

Non-maintainers were significantly more likely to report that access to facilities prevented them from exercising compared to those who were maintainers.

Participants used a three-point Likert scale from zero (never) to two (always). A mean factor score for Planning was then calculated. A one way Analysis of Variance (ANOVA) revealed significant differences between groups. Those who were non-maintainers ($M = 1.13$) had significantly lower mean scores on Planning than did the maintainer group ($M = 1.59$), $F(1,606) = 85.63, p < .001$. Those who were non-maintainers were significantly less likely to create a plan for exercising compared to the maintainers.

The second factor had three items from the barriers to exercise questions. Items included cost to join a facility, lack of facilities close to home, and poor accessibility to facilities. Respondents used a four-point Likert scale from strongly disagree (1) to strongly agree (4). A mean factor score was calculated. A one way ANOVA revealed significant differences between groups. Those who were non-maintainers had significantly higher mean scores ($M = 1.93$) than did maintainers ($M = 1.65$), $F(1, 587) = 21.02, p < .001$. Non-maintainers were significantly more likely to report that access to facilities prevented them from exercising compared to those who were maintainers.

The third factor had three items that centered on negative attitudes towards exercise and included the items "I find physical activity unpleasant," "I find physical activity boring," and "I am prevented from maintaining my exercise program because of lack of interest in being physically

Table 3

Factor Analysis for Planning and Barriers

	Rotated Factors			
	Planning ($\alpha = .92$)	Facility Barriers ($\alpha = .82$)	Negative Affect ($\alpha = .77$)	Positive Affect ($\alpha = .76$)
I find physical activity interesting.	–	–	–	–
I find physical activity unpleasant.	–	–	.89	–
I find physical activity boring.	–	–	.87	–
I find physical activity healthy.	–	–	–	.89
I find physical activity good.	–	–	–	.86
I find physical activity useless.	–	–	–	–
Prevented from maintaining exercise because of time constraints.	–	–	–	–
Prevented from maintaining exercise because of cost to join a club.	–	.76	–	–
Prevented from maintaining exercise because of poor accessibility to facilities.	–	.89	–	–
Prevented from maintaining exercise because of lace of facilities close to home.	–	.87	–	–
Prevented from maintaining exercise because of lack of interest in being physically active.	–	–	.63	–
Prevented from maintaining exercise because of lack of knowledge.	–	–	–	–
I have a detailed plan for when to exercise.	.87	–	–	–
I have a detailed plan for where to exercise.	.88	–	–	–
I have a detailed plan for how to exercise.	.88	–	–	–
I have a detailed plan for how often to exercise.	.85	–	–	–
I have a detailed plan with whom to exercise.	–	–	–	–

active." Each item was scored using a four-point Likert scale from strongly disagree (one) to strongly agree (four). A mean factor score was calculated. A one way ANOVA revealed significant differences between groups. Those who were non-maintainers had significantly higher mean scores ($M = 2.01$) than did maintainers ($M = 1.73$), $F(1, 578) = 27.94$, $p < .001$. Non-maintainers were significantly more likely to report a negative attitude prevented them from exercising compared to those who were maintainers.

The fourth factor had two items from attitudes toward physical activity questions. Items included viewing physical activity as healthy and good. Respondents used a four-point Likert scale from strongly disagree (1) to strongly agree (4). A mean factor score was calculated. A one way ANOVA revealed significant differences between groups. Those who were non-maintainers had significantly lower mean scores ($M = 3.64$) than did maintainers ($M = 3.75$), $F(1, 603) = 8.29$, $p < .01$. Maintainers were significantly more likely to report a positive attitude towards exercising compared to those who were non-maintainers.

The Exercise Self-Efficacy scale contained mean scores calculated on the total scale score and on the six subscales. Significant differences were found on the overall scale score and on all six factors between non-maintainers and maintainers. Maintainers ($M = 3.39$) had higher mean scores on exercise self efficacy than did non-maintainers ($M = 2.57$), $F(1,449) = 84.69$, $p < .001$. Maintainers were significantly more confident in their ability to maintain exercise despite obstacles than were non-maintainers. On the Negative Affect subscale, non-maintainers had significantly lower mean scores ($M = 2.55$) than did maintainers ($M = 3.55$), $F(1, 581) = 106.65$, $p < .001$. When under stress or feeling depressed,

Table 4

Analysis of Variance--Self-Efficacy Scale

	Sum of squares	*df*	Mean square	*F*	*p*
Self Efficacy (SE) Overall score					
Between groups	74.28	1	74.69	84.69	.001
Within groups	393.82	449	.88		
Total	468.11	450			
Negative Affect Factor (SE)					
Between groups	144.49	1	144.49	114.18	.001
Within groups	735.24	581	1.27		
Total	879.73	582			
Excuse Making Factor (SE)					
Between groups	119.44	1	119.44	106.65	.001
Within groups	655.15	585	1.12		
Total	774.60	586			
Must Exercise Alone Factor (SE)					
Between groups	63.27	1	63.27	40.69	.001
Within groups	820.99	528	1.56		
Total	884.27	529			
Inconvenient to Exercise Factor (SE)					
Between groups	67.88	1	67.88	49.26	.001
Within groups	728.94	529	1.38		
Total	796.83	530			
Resistance From Others Factor (SE)					
Between groups	68.23	1	68.23	39.99	.001
Within groups	873.61	512	1.71		
Total	941.84	513			
Bad Weather Factor (SE)					
Between groups	127.81	1	127.81	114.18	.001
Within groups	970.78	576	1.69		
Total	1,098.59	577			

non-maintainers were significantly less likely than maintainers to continue to exercise. On the Excuse Making subscale, non-maintainers had significantly lower mean scores ($M = 2.04$) than did maintainers ($M = 2.94$), $F(1,585) = 106.65$, $p < .001$. Maintainers were significantly more confident they would continue to exercise when under time constraints than were non-maintainers. On the Must Exercise Alone subscale, again, non-maintainers had significantly lower mean scores ($M = 3.17$) than did maintainers ($M = 3.86$), $F(1,528) = 40.69$, $p < .001$. Maintainers were significantly more likely to exercise alone than were non-maintainers. On the Inconvenient to Exercise subscale, non-maintainers had significantly lower mean scores ($M = 2.42$) than did maintainers ($M = 3.14$), $F(1,529) = 49.26$, $p < .001$. Maintainers were significantly more confident that they would find a way to exercise when they were traveling or did not have access to a facility. On the Resistance from Others subscale, non-maintainers had significantly lower mean scores ($M = 2.88$) than did maintainers ($M = 3.61$), $F(1,512) = 39.99$, $p < .001$. Non-maintainers were significantly more likely not to exercise when they did not have the support of family or friends. For the Bad Weather Factor, non-maintainers had significantly lower mean scores ($M = 2.50$) than did maintainers ($M = 3.44$), $F(1,528) = 75.84$, $p < .001$. Non-maintainers were significantly more likely not to exercise when the weather was bad. Table 4 presents the Analysis of

Variance results for the overall scale score and each of the subscales of the Exercise Self-Efficacy scale.

Conclusions

Maintainers were more likely than non-maintainers to have a plan regarding when, where, and how they were going to exercise. This finding supports Rodgers, Hall, Blanchard, McAuley, and Munroe's (2002), study which found that planning was an important aspect of exercising regularly, especially regarding time management. The planning component in health education programs is often emphasized at the beginning of a behavior change. Health educators must not limit themselves to promoting programs that increase initiation of physical activity, but place more emphasis on the need for planning as a method of increasing the likelihood that individuals would reach the maintenance level of physical activity. Maintaining an exercise routine as a lifestyle is important for individuals to realize the positive health benefits that sustained physical activity can offer. Similar to recommendations made from Litt et al., (2002) health educators should employ methods at initiation of behavior change that contribute to maintenance of those behaviors over time.

Health educators should emphasize overcoming barriers as an important component for establishing long term maintenance more so than strengthening positive attitudes.

Previous studies examined people's exercise behavior as relevant to their favorable and unfavorable attitudes toward exercise (Conn, Tripp-Reimer, & Maas, 2003). Study participants indicated that negative attitudes served as a significant barrier to exercise. Participants in this study were highly educated which some studies suggest contributes to higher levels of physical activity (Chen & Miller, 2003). However, knowledge does not always equate to action and non-maintainers reported similar barriers as is reported in the general population regarding time, interest, and knowledge. Although a significant difference was found between maintainers and non-maintainers with regard to positive attitudes toward exercise, this was the weakest relationship found. The small difference between mean scores indicates this finding is not practically significant. This finding is supported by research regarding decisional balance and stages of change in which, depending on the stage an individual is in, an emphasis on overcoming barriers is more important than a focus on the benefits of the behavior change (Schwarzer & Fuchs, 1996). Health educators should emphasize overcoming barriers as an important component for establishing long term maintenance more so than strengthening positive attitudes. Further analysis regarding stages of behavior change with regard to physical activity with this population may provide insight on the issue of decisional balance and health education efforts.

The self-efficacy results support the evidence that individuals with high self-efficacy are able to maintain physical activity in spite of obstacles; more specifically excuse making, exercising alone, resistance from others, and bad weather. Self-efficacious individuals respond with better strategies, more effort, and prolonged persistence to overcome hurdles (Prochaska et al., 2002). Findings from this study demonstrated that both maintainers and non-maintainers report similar barriers to physical activity. Higher levels of self-efficacy made the difference in action. Therefore, increasing self-efficacy may be key in health education strategies aimed at maintaining physical activity. Self-efficacy is such an important concept in health psychology that it has become a component of most health behavior theories (Schwarzer & Fuchs, 1996). Health educators can increase self-efficacy with program participants by using Bandura's (1997) work regarding the four sources of self-efficacy (performance accomplishments, vicarious experience, verbal persuasion, and physiological feedback). Further studies are needed to explore maintenance self-efficacy among this population that are larger and more representative in scope.

Assumptions of this study included that participants were being honest when recalling their level of physical activity, the participants were representative of their university, and that the survey questions were appropriate to support the hypothesis.

Limitations in this study included a low response rate to the survey (21%) which raises the question of whether those who responded to the survey were significantly different from those who chose not to respond to the survey. The fact that so many respondents met the criteria to be classified as a "maintainer" suggests that those who did not engage in physical exercise were unlikely to complete and return the survey. There was little racial/ethnic/marital diversity among participants indicating a homogenous group. In addition, out of 119 departments of which the survey was sent to the department head, 13 departments had no response indicating the possibility the survey was not distributed. Additional follow up could have revealed insight into the response rate. Another limitation was the use of a convenience sample. Only three universities were included in the sample. Geographic location, a non-random sample, a small number of schools, and the lack of variability in the size of the schools limit the ability to generalize the findings to other universities.

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